THE CONSEQUENCES OF ATELECTASIS PULMONUM OR ALLIED CONDITIONS, AND THE DIAGNOSTIC DIFFICULTIES THEY CAUSE WHEN COMPLICATING OTHER DISEASES.

DELIVERED AT A MEETING OF THE EAST SURREY DISTRICT OF THE METROPOLITAN COUNTIES BRANCH OF THE BRITISH MEDICAL ASSOCIATION.

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Incompleteness or want of expansion of the lungs at birth, or atelectasis, and lobular pneumonia in early life, such as results from measles, whooping-cough, and under some other conditions, lay, as is well known, the foundation of chronic degenerative changes in the lungs, of which the main anatomical factor is dilatation of the bronchial tubes, or bronchiectasis, and the main clinical indications are the symptoms of chronic bronchitis.

There are two varieties of dilated tubes met with in these cases,—the first, and more common, being that in which the tubes generally, or mainly the smaller branches, are expanded into cylindrical or moniliform channels, the arrangement and general appearance of which remind one of the fingers of a glove; the other being that in which the terminal portions only of the bronchial tubes are dilated, forming rounded cavities from the size of a filbert downward, with each of which an undilated bronchiole communicates. In the former condition the dilated tubes are separated from one another by crepitant lung-tissue. The latter condition is generally limited to one lung or to a single lobe, and the cavities are surrounded and separated from one another by a comparatively small amount of indurated fibroid tissue which represents what formerly was lung-tissue. In the one case the flask-like cavities appear to become developed in lungs or parts of lungs which either have never expanded or have undergone complete collapse or consolidation; in the other case the lesion would seem to arise in the midst of lung-tissue still subserving respiration. But in

both cases there is reason to believe that the early stage of dilatation is due to the accumulation of muco-purulent fluid in the tubes and their gradual distention thereby, and that the later stages are due partly to the continuance of this cause, partly to the stretching influence of inspiration over the already existing cavities.

It is not an uncommon thing to meet with persons, for the most part young, who have suffered, either from birth or from early childhood, from more or less continuous cough and muco-purulent expectoration, and present some degree of cyanosis together with the local indications of bronchitis, and in whom these phenomena are due to the condition of the lungs in question. In some of these cases, as might be supposed, the patients remain undersized and ill developed, present clubbed fingers and toes, and the cyanosis is as intense as it is in typical cases of congenital heart-disease. My object on the present occasion, however, is not so much to consider the pathology and symptoms of the morbid state to which I have just directed your attention as it is to narrate briefly a few cases which have come under my notice, wherein its association with some other pathological condition has interposed a difficulty in the way of accurate or ready diagnosis and rendered them specially interesting.

Case I.—The first case occurred more than thirty years ago, and I have been unable to lay my hands on the notes that were made of it at the time. But the essential facts, so far as concerns my present paper, remain vividly in my memory. One day, while in the wards, I was requested, in the absence of the physician under whose care he was, to see a patient in whom urgent symptoms had arisen. He was a man between thirty and forty years of age, who was suffering from the usual symptoms of acute meningitis, and who was lying in bed on his left side insensible and with retracted head. I examined him carefully so far as I was able, satisfied myself that he was dying of intracranial inflammation, and discovered that over the whole of the right side of the chest, which was uppermost, there were loud gurgling sounds such as might have resulted from extensive breaking down of lung-tissue. The man was too ill to allow of a thorough examination; and no history had been, or could be, obtained as to his state of health prior to the recent supervention of his fatal malady. Guided largely by the apparent extensive breaking down of the tissue of his lung, I came to the conclusion that he was suffering from tubercular meningitis coming on in the course of advanced or acute pulmonary phthisis. He died shortly afterwards, and the next time I saw him was in the post-mortem room. The examination of his head

revealed extensive recent meningitis, but there was no trace of tubercles. The right lung was studded from apex to base with globular cavities, varying, roughly speaking, from the size of a filbert to that of a pea. It presented, in fact, a well-marked example of the second form of dilated tubules to which I have already called attention. The other lung was essentially healthy. There were no tubercles in either lung. So far as I recollect, no further disease was discovered. Of course I was mistaken in my diagnosis; nevertheless, I do not feel particularly ashamed of my error. I regarded the case by the light of the post-mortem examination, and I regard it still, as one in which there was the accidental association of recent simple meningitis with long-standing disease of one lung, probably arising out of the non-expansion of the organ at the time of birth.

Case II.—My second case was that of a girl, eighteen years of age, who came into St. Thomas's under my care on March 14, 1889. The history she gave of herself was as follows. She had never been strong. When about twelve she had had a severe attack of measles, followed by bronchitis and inflammation of the lungs, which with relapses had laid her up for three months. She had ever since suffered from shortness of breath and a winter cough attended with thick expectoration, and once or twice had had attacks of what was called inflammation of the lungs. Her last attack of bronchitis had come on in the previous November, and had lasted ever since. She had been especially ill during the last fortnight. She had never spat blood or had night-sweats, and had not lost flesh. She was an undersized, pallid, round-faced, expressionless person, having the aspect and development of a girl of thirteen or fourteen, and a manner and look that suggested some feebleness of intellect. The terminal joints of the fingers and toes were bulbous. She looked ill, and complained of dyspnœa and of cough attended with abundant muco-purulent expectoration. The chest was rounded, and moved only slightly during respiration. It was generally highly resonant. Expiration was prolonged, and both expiration and inspiration were attended with rhonchi and subcrepitation. The heart's area of dulness was ill defined, but its position and sounds were normal. Her tongue was coated, her appetite poor, her bowels regular. Nothing was found amiss in the abdominal cavity; and the urine, which had a specific gravity of 1020, was free from albumin.

The history, the symptoms, and the results of examination were suggestive of chronic bronchitis; and the whole aspect and development of the girl pointed either to its congenital origin or to its super-

vention in childhood. After careful consideration, I came to the conclusion that she was suffering from chronic bronchitis associated with the presence of dilated tubes.

Four days after admission she had hæmoptysis, for the first time in her life, bringing up suddenly about four ounces of blood; and subsequently this frequently recurred in varying, but never in large, quantities. Her cough also continued very troublesome and attended with copious muco-purulent expectoration; and she suffered from constant dyspnœa. The results of the physical examination of her chest, though they varied from time to time, were never decisive as to the condition of things within. There were always generally distributed rhonchi and crepitations, which latter were mostly coarse, but sometimes and in some situations were fine. It was thought that the right side became a little duller than its fellow, and perhaps moved slightly less; and it was also thought that the vocal resonance and fremitus at the apices were more pronounced than they should be, and that occasionally the respiratory sounds were tubular in quality. But there was never clear evidence of the presence of pleuritic effusion, of definite consolidation, or of the formation of apex-cavities. The temperature, however, became high, and often varied between 102° and 105°; and she gradually became weaker and thinner and more and more seriously ill.

The coming on of hæmoptysis and of persistent febrile temperature very soon led me to reconsider my first-formed opinion, and to suspect that she must be suffering from pulmonary tuberculosis. The question then arose whether the case was one of simple bronchiectasis associated with bleeding from the congested mucous membrane of the dilated tubes, or whether it had been primarily one of bronchiectasis with tubercle supervening comparatively recently as an accidental complication, or whether her symptoms even from the beginning had been due to chronic tuberculosis alone. It was largely in the hope of being able to solve this question that the chest was repeatedly examined, but, as I have already said, without definite result. And with the same object the sputum was submitted to microscopic investigation, but no bacilli were detected. The view which I adopted was the second,—namely, that her case was one of old bronchiectasis associated with recent tubercle. I may add that during her residence in the hospital she once or twice had a little diarrhœa, and that on several occasions her urine presented a trace of albumin, but that she never had abdominal pain, or uneasiness or irritability of the bladder, or pain in micturition, or anything to suggest that there was serious disease in any of the abdominal or pelvic organs.

She died on the 20th of May. The result of the post-mortem examination was very interesting and instructive. Both lungs, but the right one more extensively than the other, were bound down by old adhesions. The left was large and generally crepitant; and, although it is not so stated in the post-mortem notes, I believe that some of the bronchial tubes connected with its lower lobe were dilated. The right lung was smaller and heavier than the other, and, though not solid, gave the impression of having been the seat of former consolidation and of having never perfectly recovered. Many of its bronchial tubes were dilated and intensely congested, and a few contained altered blood. Both lungs were studded with tubercles varying in size from that of a small pea downward, the larger being cheesy, the smaller gray. They were most abundant at the apices, but nowhere had induced continuous consolidation or undergone softening. The heart was healthy.

The left kidney was the seat of chronic tubercles in an advanced stage. The calyces were greatly enlarged, and presented ragged and breaking-down parietes; and the substance of the organ, but mainly the parts immediately bounding the calyces, was infiltrated with abundant cheesy tubercular deposit. The mucous membrane of the ureter and of the bladder presented a beautiful example of the tubercular process in an early stage. It was studded with circular areæ from the size of a sixpenny piece downward, which were not unlike patches of cutaneous ringworm or erythema circinatum. They were either slightly elevated rosy disks, or broad, slightly elevated rosy rings each encircling a somewhat depressed and eroded or excoriated, grayish or yellowish central area. The intervening net-work of mucous membrane was quite normal. The right kidney and the spleen presented a few miliary tubercles; and the lower part of the small intestine showed some small tubercular ulcers of recent origin. There was no tubercle in the uterus or the Fallopian tubes. All other parts of the body were free from disease.

The autopsy obviously confirmed the accuracy of the diagnosis which had been adopted,—namely, that the patient's disease, so far as the lungs were concerned, was in the first instance chronic bronchitis and dilated tubes secondary to some former inflammatory condition of the organs, and that the tubercular affection was of comparatively recent origin and a mere accidental complication. This latter had probably supervened during her last winter's bronchial exacerbation. The kidney-disease was of much older date, and was doubtless the source from which the lungs and other organs had received infection.

The condition of the bladder was something quite novel to me. I have, of course, seen tubercular ulceration of this part; but I had never seen it in so early a stage or presenting such characters as were observed here. Looking back on the case, I cannot help regretting that we did not examine the urine for bacilli. But, in excuse, I must repeat that, beyond the occasional presence of a trace of albumin, there were never any symptoms pointing to implication of the kidneys or of the bladder; and the albuminuria seemed to be sufficiently explained either by the indirect influence of her chronic pulmonary affection or by her nearly constant high fever.

Case III.—My third and last case came under my care on the 30th of last October, and died on the 21st of last December. The patient was a girl, fifteen years of age, who had suffered from shortness of breath and cough with expectoration ever since she was a baby. She had been always more or less livid, and of late dropsical. She had also latterly suffered much from sickness. She was an ill-developed child, presenting a universal dusky tint, with deep lividity of lips, nose, cheeks, ears, and fingers, general anasarca, chiefly marked in the lower extremities, and clubbed fingers and toes. Her chest was rounded and moved only slightly. The lungs were resonant and everywhere presented abundant and loud rhonchi. Her respirations were twenty-eight in the minute; she had a frequent cough, and expectorated much thick muco-purulent fluid. The heart's area of dulness was small; the apex-beat was just below and internal to the nipple; and there was forcible pulsation over the whole cardiac area and in the scrobiculus. There was a loud systolic murmur, best heard in the neighborhood of the apex, but audible also at the base, in the axilla, and in the back. It did not appear that any murmur originated at the base; but the second sound was louder over the pulmonic area than to the right of the sternum. The pulse was small, weak, and slightly irregular. The abdomen was large, measuring twenty-nine inches in girth, and obviously contained fluid. The liver was large and smooth, extending to within two inches of the umbilicus. Tongue furred; appetite poor; frequent sickness; bowels regular. The urine was turbid with urates, and presented a sp. gr. of 1028, and a trace of albumin.

During the first ten days she remained in much the same state as on admission; still short-breathed and livid, still coughing and spitting much thick phlegm, and still presenting the loud systolic apex-murmur; but her dropsy increased, and the girth of her belly advanced to thirty-one inches. She was then tapped; but only thirty-

two ounces of serum were removed. Nevertheless, the operation gave her some relief.

All this time I had been giving a good deal of thought to the diagnosis of her case. At first (looking to the deep cyanosis, the dropsy, the loud apex-murmur, and the life-long duration of her illness) I inclined to the opinion that she was suffering from congenital heart-disease, and that this was the direct or indirect source of all her sufferings. But as time went on I became more and more impressed with the facts that she had been suffering from specific bronchial symptoms from her earliest infancy, and that at the present time she was still suffering mainly from bronchitis, as was shown by her pulmonary symptoms, the physical condition of her chest-walls and lungs, and the abundance and character of her expectoration. And then (acknowledging to myself that chronic bronchitis is not a necessary consequence of cardiac lesions, that cyanosis may be caused either by chronic pulmonary or by cardiac disease, and that it is not uncommon in cases of hypertrophy of the right side of the heart due to obstructive disease in front for regurgitation through the tricuspid orifice, and consequently a systolic murmur, to ensue) I came to think it probable that her illness had begun from atelectasis or broncho-pneumonia in early childhood, that dilated tubes with persistent bronchitic symptoms had followed, and that her morbid cardiac phenomena and cyanosis were later sequelæ of her original malady. Of course it still remained possible that malformation of the heart was present as an accidental accompaniment of the pulmonary disease.

During the rest of her sojourn in the hospital her symptoms varied somewhat, but on the whole she got worse. The ascites returned, and paracentesis was again performed. Her general dropsy increased largely, and to relieve it, Southey's tubes were inserted into the legs, and (these failing) subsequently several punctures were made from which much serum was discharged. But erysipelas attacked the left leg, much febrile disturbance ensued, and superficial sloughs formed. Nevertheless, after a few days of ingravescence, the local symptoms gradually subsided. During the last two or three weeks of her life she was extremely ill; far too ill, indeed, to allow of any careful physical examination. And, without any material change in the character of her symptoms, she died seven and a half weeks after her admission.

The following is the account of what we discovered post mortem. The body was generally œdematous; and on the dorsum of the left foot was a large area of ulceration, exposing the deep fascia. There were old adhesions, and about half a pint of serous fluid, in each pleura.

The right lung was heavy, of a uniform livid red color, smooth on section, and quite airless. The bronchial tubes were for the most part dilated to near the surface of the lung, and their walls thickened. The left lung was very œdematous, but crepitant, and its bronchial tubes were in the same condition as those of its fellow. The heart was somewhat enlarged, weighing nine ounces. The apex was formed equally by the apices of both ventricles. The left ventricle was healthy. The right did not appear to be dilated, but its walls were fully as thick and firm as those of the left, which, by the way, seemed a little thinner than natural. The right auricle was also thickened and dilated. The valves were quite healthy in structure and appearance; but I believe their competence was not tested. The abdomen contained three pints of fluid. The liver was large, weighing one pound twelve and a half ounces; its capsule was thick and opaque, and its substance tough and congested. The spleen and kidneys were large, firm, and congested. All the other organs were healthy. Looking at this case by the light thrown upon it by the post-mortem examination, there can be no doubt that there was no congenital cardiac defect, but that the patient had suffered from bronchiectasis from birth or early infancy, and that the anatomical and other peculiarities of her heart were simply the consequences of prolonged obstructive pulmonary disease.

In conclusion it may seem that the cases which I have narrated form a somewhat heterogeneous or motley group; and I admit that in a sense they do. At the same time the existence of the common factor "bronchiectasis" in all of them (forming as it were a common background, in itself interesting, to pictures otherwise dissimilar yet interesting also in their points of difference) has always linked them together in my mind. And it is because the cases have been thus interesting and instructive to myself that I have thought they might prove in some degree interesting and instructive to others.